

# AMERICAN MUSEUM NOVITATES

Number 987

Published by  
THE AMERICAN MUSEUM OF NATURAL HISTORY  
New York City

May 13, 1938

## FOUR NEW MAMMALS FROM COSTA RICA

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In a preliminary study of the Costa Rica mammals recently collected by the veteran collector, Mr. C. F. Underwood, and now in various museums of the United States, I find four new geographical races. Several new forms and one new genus have already been described from Underwood's Costa Rica material.

I am indebted to the Biological Survey and the Field Museum for permission to describe new species in their collections. It gives me pleasure to thank Major E. A. Goldman of the Biological Survey and Dr. Glover M. Allen of the Museum of Comparative Zoölogy for comparing the new forms with types in their collections and for the benefit of their valued opinions.

### ***Potos flavus arborensis***, new subspecies

Costa Rica Kinkajou

TYPE.—No. 250320, U. S. Nat. Mus. (Biol. Survey Coll.); female adult; El Sauce Peralta, a farm on the Atlantic railroad less than halfway from San José to Limón, Costa Rica; altitude about 1000 feet; June 4, 1931; collector, C. F. Underwood. The type is a skin and skull in good condition.

GENERAL CHARACTERS.—A large light-colored kinkajou, with dark dorsal line and dusky feet, large skull with flat bullae, and upper molars relatively narrow antero-posteriorly; larger and paler than *P. f. chiriquensis* from Boqueron, and also differs in distinctive cranial characters.

DESCRIPTION.—Color of upper parts in general about clay-color (color nomenclature that of Ridgway), hair dusky brownish for the greater part of its length, evenly covered with creamy buff, finely mixed with black-tipped hairs, purest on flanks and outer side of limbs; top of head and face darker than rest of body; a narrow blackish-brown dorsal stripe from crown of head to base of tail; under parts, including inner side of hind limbs and under side of basal half of tail, rich pinkish buff; ears thinly clothed with cinnamon-brown; feet and toes mummy brown; tail above about like back, but becoming darker toward tip.

SKULL.—Large, with high braincase; frontal profile convex; basioccipital broad; bullae flat and elongated; postorbital processes short and peg-like; palate short.

MEASUREMENTS.—Head and body, 476 millimeters; tail vertebrae, 496; hind foot (without claws), 98; ear, 38. Skull: greatest length, 93.5, condylobasal length, 87.8; zygomatic breadth, 62.3; interorbital breadth, 21.8; postorbital constriction, 22.1; breadth across mastoid processes, 37.3; breadth of braincase, 40.9 upper tooth-row, from canine to back of last molar, 26.4.

*Potos f. arborensis* requires comparison only with *P. f. campechensis* and *P. f. chiriquensis*. Compared with *campechensis*, it is larger. The color is similar, but less yellowish, with more black on the feet; the braincase is much larger, higher, and more inflated; frontal profile more convex; postorbital processes shorter, more peg-like; basioccipital broader; palate shorter, more as in *chiriquensis*; bullae flatter, narrower, and more elongated antero-posteriorly; dentition similar but rather heavy. Compared with *chiriquensis*, *arborensis* is larger, much lighter in color, with larger skull, higher braincase, frontal profile more convex, postorbital processes similarly short and peg-like; palate short, as in *chiriquensis*, bullae more elongated posteriorly; dentition similar, but carnassials relatively broader than usual in *chiriquensis*. The narrow blackish median dorsal stripe may have no special significance, as this feature is variable in other forms.

***Urocyon cinereoargenteus costaricensis*, new subspecies**

Costa Rica Gray Fox

TYPE.—No. 35170, Field Mus. of Nat. Hist.; male adult with worn molars; Savanilla de Pirris, a town on the Pacific coast range near Rio Grande de Pirris, Department of San José, Costa Rica; altitude about 500 feet; April 2, 1931; collector, C. F. Underwood. The type is a skin and skull in good condition.

GENERAL CHARACTERS.—A rather small dark-colored gray fox, with dark underfur and small skull with short slender rostrum, small rounded bullae, small teeth and relatively long palate.

DESCRIPTION.—Pelage moderately long and coarse; upper parts gray formed by the nearly equal mixture of black tips and white subterminal bands of the coarse hairs; underfur on back Prout's brown completely covered by overlying guard hairs; top of head like back, but more finely grizzled; black tips of sides less conspicuous than on back and underfur pinkish buff; outside and behind base of ear between dull ochraceous tawny and hazel; tip of ear mixed with black hairs, inner side of ear whitish; chin, under side of mouth and muzzle mummy brown finely mixed with white; lips and from corner of mouth to throat dull white; upper side of fore and hind limbs and feet a mixture of black and buff; inner and under side of limbs cinnamon-buff; tail, above, mixed buff and black, tip black, under side of tail cinnamon-buff; under parts, hair broadly drab from base and tipped with cinnamon-buff; indefinitely along median line and between hind limbs, pectoral area and throat buffy white.

SKULL.—Small, with short, slender rostrum, and small rounded bullae; teeth small, the longitudinal axis of the third upper premolar not in a plane parallel to that of first and second, but anterior edge turned in so that there is a relatively sharp angle in the toothrow at this point; palate long, interpterygoid fossa not extending forward beyond a plane between the posterior edge of last molars; mandible short, teeth crowded; ascending ramus very broad and upper edge sloping evenly backward to coronoid process.

MEASUREMENTS.—Skull: greatest length, 111.2; basal length, 103.6; palatal

length, 55.5; zygomatic breadth, 61.4; least interorbital breadth, 21; length of audital bullae, 16.6; upper tooththrow, exclusive of incisors, 45.7; lower tooththrow, exclusive of incisors, 51.3; combined length of upper molars, 13.

Compared with specimens of *U. guatemalae* from Guatemala the Costa Rica gray fox is generally darker in color throughout, without the bright, tawny shades about the ears and white on under side of limbs and body; skull smaller, bullae smaller and more rounded, teeth smaller, and a sharper angle in the maxillary tooththrow at  $pm^3$ ; mandible shorter and heavier, with wider ascending ramus. Compared with *U. c. furvus*, from Panama, the Costa Rica gray fox is a much darker and less buffy animal, with more abundant black-tipped hairs; underfur everywhere very much darker; head less buffy and the limbs and feet darker. The skull of *costaricensis* is noticeably larger and broader than that of *furus*, rostrum heavier, interpterygoid fossa broader and shorter, space between the bullae wider and teeth differently spaced. In spite of the shorter skull in *furus*, the individual teeth are not significantly larger, although  $m^2$  is visibly larger than in *costaricensis*, and  $pm^3$  overlaps the inner cone of  $pm^4$ .

Besides the type there are skulls of an adult female and a young male from Pozo Azul, Costa Rica, in the American Museum collections.

#### ***Peromyscus nudipes orientalis*, new subspecies**

##### Eastern Costa Rica White-footed Mouse

TYPE.—No. 123494, Amer. Mus. Nat. Hist.; male adult; El Sauce Peralta, Costa Rica, a farm on the Atlantic railroad, less than halfway from San José to Limón; altitude about 1000 feet; July 7, 1931; collector, C. F. Underwood. The type is a skin and skull in good condition.

GENERAL CHARACTERS.—A medium-sized mouse with rather full and soft pelage; moderate-sized ears, nearly naked; relatively short tail, nearly unicolor, scaly with very short stiff hairs; soles of hind feet narrowly naked medianly; skull similar to *nudipes* but smaller.

DESCRIPTION.—Unworn pelage, upper parts between ochraceous tawny and clay-color mixed with black, forming a broad blackish-brown area from crown of head to base of tail; sides of body and cheeks chiefly clay-color; ring around eye blackish; ears dusky; fore feet white, forearm dusky nearly to wrist; hind feet white with a wedge of dark color extending to just below tarsal joint; tail yellowish white, above, slightly paler below, becoming black all around at tip; under parts white washed with cinnamon-buff; pectoral spot of clay-color.

SKULL.—Relatively small, broad, with wide braincase and spreading zygomatic arches; molar teeth small; nasals short, terminating in front of the fronto-premaxillary sutures, similar to *P. nudipes* but much smaller with smaller teeth.

MEASUREMENTS OF TYPE.—Head and body, 116 millimeters; tail vertebrae 124; hind foot, 27; ear, 21. Skull: greatest length, 33; zygomatic breadth, 15.7;

interorbital constriction, 5.2; length of nasals, 12.5; alveolar length of upper molar series, 4.8. Adult male topotype, 115, 130, 26, 33, 16, 4.8, 13, 4.5.

Externally *P. nudipes orientalis* may be distinguished from typical *P. nudipes* by its smaller size, shorter tail, shorter and somewhat coarser pelage which is a dull clay-color instead of the ochraceous-russet shades in *P. nudipes*.

El Sauce Peralta is in the lowlands near the Atlantic coast and seems the best place for the type locality. Specimens from Cervantes, while showing a somewhat greater development in the characters of this new form, come very near the type locality of typical *P. nudipes*. The series from Cervantes have under parts stained with clay-color. This may be due to the preservative in the preparation of the specimens or to the juice of some kind of fruit or vegetable matter.

***Liomys salvini aterrimus*, new subspecies**

Western Costa Rica Spiny Pocket Mouse

TYPE.—No. 35211, Field Mus. Nat. Hist.; female adult; Savanilla de Pirris, a town on the Pacific coast range, near the Rio Grande de Pirris, Department of San José, Costa Rica; altitude probably about 500 feet; April 12, 1931; collector, C. F. Underwood. Only one specimen known—the type. Skin and skull in good condition.

GENERAL CHARACTERS.—A small dark-colored pocket mouse, without yellowish lateral line; a narrow slaty gray edging on outer side of forearm; sole of hind foot hairy posteriorly and six-tuberculate; similar in general color and size to *L. s. nigrescens*, but differing in longer tail, blacker pelage, and distinctive cranial characters.

DESCRIPTION.—Pelage moderately long and hispid; tail very long in comparison with hind foot; color of upper parts from tip of nose to base of tail uniform brownish black; ears dusky, sparsely covered with fine black hairs; tail distinctly bicolored, blackish brown above, white below except tip, which is blackish all around; forearms white, with a few scattered dusky hairs on outer side; forefeet white; outer side of hind limbs like back, the dark color extending down upper side of hind limbs to halfway between toes and ankles; soles of feet posteriorly and under sides of ankles dusky; under parts, including lips, chin, inner side of hind limbs and upper sides of hind feet and toes creamy white.

SKULL.—Similar in size to *L. s. nigrescens*, but not depressed in parietal region; premaxillae broad reaching posteriorly well beyond nasals; nasals long and narrow, tapering evenly; rostrum long and broad; superorbital ridges weakly developed; upper incisors large.

MEASUREMENTS.—Head and body, 110 millimeters; tail vertebrae, 132; hind foot (without claws), 25; ear, 14. Skull: greatest length, 34.2; zygomatic breadth, 16; interorbital breadth, 7.5; length of nasals, 13.8; breadth of rostrum, 6.15; alveolar length of upper molar series, 4.9.

The Savanilla specimen shows characters which, if constant, differentiate the form probably inhabiting the general lowland region of western



Costa Rica. The tail in this specimen is very long in comparison with the hind foot and, while it is a rather old adult, the broad rostrum, broad premaxillae, and very large upper incisors, as compared with specimens of *L. s. nigrescens*, from 4000 feet elevation at Villa Colon, seem to be beyond the range of individual variation.

Major Goldman is of the opinion that specimens from near San José probably represent typical *nigrescens* and that, from what we know of the range of this group on geographical grounds, we could expect the occurrence of a different form near the west coast. The type locality for *L. s. nigrescens* has not been fixed. According to Goldman, it seems a fairly reasonable assumption that it must have come from a more accessible part of Costa Rica, which would probably have been either the east side or the highlands which were generally worked many years ago.

